GLOBAL AGENDA FOR SUSTAINABLE LIVESTOCK

# Good practices for responsible use of antibiotics

-addressing antimicrobial resistance by supporting healthy and productive livestock (version 1.0)


**This is a presentation of practises and cases from small scale production in Sub-Saharan Africa, poultry production in high-income countries and mastitis prevention in dairy production.**

The emergence of antimicrobial resistance (AMR) is a threat to the advances that have been made in human health and well-being over several decades. In addition, food security is put at risk, as our livestock's health and welfare depend on effective treatment options. Scenarios estimate that AMR


## Key messages

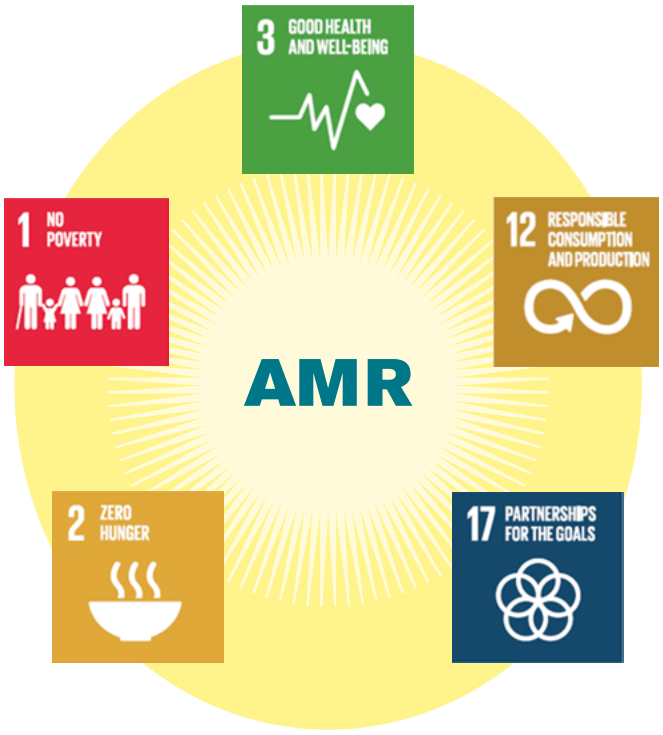
In this first version of the Livestock Antimicrobial Partnerships' *Good practices*, we display practices and some cases from different livestock systems around the world aimed to reduce antibiotic use and maintain or improve animal health.

- In low-income countries the access to animal health service and quality pharmaceuticals are identified as a major challenge.
- The majority of the practises submitted to LAMP are from producers' organisations.
- Where a reduction in use of antibiotics has been implemented by applying these practises, it is indicated that the profit of the production is not severely affected.
- However, combined and reliable records of antibiotic use, antibiotic resistance, animal health and productivity are rare.
- Thus, the "good" of practices are sometimes lacking evidence from the field.

will contribute to several million human deaths per year globally and 10% production loss in the livestock sector in low income countries by 2050, if the emergence and spread of AMR is not curbed. The development of AMR is very much enhanced by the misuse and overuse of antibiotics. To protect the efficacy of antibiotics it is crucial to reduce the overall consumption and to use antibiotics in a medically rational way when necessary. The livestock sector is a significant contributor to the global pool of bacterial resistance genes in the biota, although the magnitude of the attribution of veterinary antimicrobial use to resistant microbes in the human population is unclear.

However, for the sake of animal health, welfare and productivity and for being precautionary vis a vis human health, it is strategically sound to work towards reducing the use of antibiotics in the livestock sector in several settings. This true One Health work relates to several of the Sustainable Development Goals and aims to improve livestock practices which contributes to better animal health and reduces the reliance of using antimicrobial treatments.

Here the LAMP (Livestock Antimicrobial Partnership) within the Global Agenda shares good practices for reducing the use of antibiotics in three different livestock systems. The three systems dealt with here, small-scale livestock production




### *Methodology*

The practises and cases presented here are based on data submitted to LAMP following invitations to the members of GASL. In addition to these data, structured according to a template at the LAMP website, a core LAMP team consisting of representatives from Vétérinaires Sans Frontièrers (VSF) International, International Poultry Council (IPC), International Dairy Federation (IDF), Royal Veterinary College (RVC), UK and Swedish University of Agricultural Sciences (SLU), has collected complementary data. The data has then been scrutinized and compiled into this document by the LAMP core team.

in Sub-Saharan Africa, intensive poultry systems and mastitis management in dairy systems, are the first ones to be share as good practices within the Global Agenda, and there is more to come.

## System 1: Small-scale livestock production in Sub-Saharan Africa

Livestock play a significant role in rural livelihoods and the economies in many countries across Africa. They provide income and employment for farmers and all the actors along the value chains, they contribute to Food and Nutrition Security of billions of rural and urban households, and they are crucial assets and safety nets for over 300 million poor people in Sub-Saharan Africa, especially for women[1].

Livestock production in the Sub-Saharan Africa occurs in a wide range of heterogeneous production systems, ranging from pastoral systems occupying large shares of grassland and drylands, to mixed crop-livestock systems in rural areas suitable both for arable and livestock production, and to intensive systems usually in peri-urban/urban

areas. Pastoralism and smallholder mixed farming systems are the main providers of meat, milk and eggs sold in the markets, and are therefore crucial for household nutrition and socio-economic development.

However, many rural areas and drylands lack proper infrastructure and services. Often the number of qualified veterinarians does not suffice to provide quality animal health services at local level[2], resulting in poorly managed animal health and leading to lower productivity and to higher risks for human health and overall One Health. Because of this scattered presence of services, livestock keepers often recur to self-treatment for their animals, using drugs sold in informal markets and without clear indications about their use, effective treatment and withdrawal period. The presence of sub-standard and non-registered veterinary medicine is indeed a widespread reality in many African countries[3]. Furthermore, because of their low availability, antibiotics are used only sporadically, for short time and routinely under-dosed.

All the factors mentioned above surely foster the emergence and spread of antimicrobial resistance, although the relative lack of data regarding the level, spread and patterns of resistance in human, animal and agricultural contexts makes difficult a proper evaluation of the problem in those areas and the definition of evidence-based response interventions.

## Six Case studies

VSF International and its NGO members have been working since over 30 years in support of small-scale livestock keepers and pastoralists in Africa, Asia and Latin America. The case studies presented below showcase some experiences from Africa related to prudent use of antibiotics.

- **Where?** Senegal, Mauritania, Mali, Burkina Faso, Niger, Sudan, South Sudan, Ethiopia, Tanzania, Somalia, Kenya, Uganda, Rwanda, Burundi and DR Congo.
- **Who?** Pastoralists, agro-pastoralists and small-scale mixed crop and livestock farmers, raising mainly ruminant species, poultry, equines, camels.


## What has been done?

Improvement of veterinary services. According to the different context and needs, efforts are made to support public and/or private veterinary services in remote areas through equipment and training.

- Training of Community Animal Health Workers (CAHW). CAHWs are farmers/field agents selected by their community with the collaboration of the veterinary public service, private veterinary doctors and supporting bodies (projects and NGOs), who are trained to provide basic animal health care services and husbandry advice to livestock keepers in their community under supervision of veterinarians. CAHWs trainings focus on prevention and prophylaxis to reduce livestock morbidity and include specific modules on prudent use of antibiotics and antiparasitic, standards of dosage and use, safe disposal of pharmaceutical waste and recommended withdrawal period.
- Improved access to veterinary drugs. Availability of good quality veterinary drugs has been improved in several areas by strengthening the supply networks. Veterinarians get access to a stock of drugs, which are subsequently distributed or sold by CAHWs to distant livestock keepers. Farmers, through CAHWs, can access to good quality veterinary drugs.

- Education and awareness raising. CAHWs and veterinary officers are supported to conduct awareness raising campaigns at the pastoral or farmer community level. Livestock keepers are sensitized on responsible use of antibiotics, good hygiene practices and preventative healthcare management of their livestock and compliance to withdrawal indications. They are also sensitized about the need to avoid buying drugs from informal sellers, who might provide substandard drugs.
- Vaccination campaigns. Large-scale vaccination campaigns for livestock and poultry are organised in collaboration with public health services and veterinary authorities. These preventative treatments form the first line of defence in the management of animal health conditions to limit the use of antibiotics.

## Challenges found

**Fragile state of animal health systems.** Poor infrastructure and weak professional governance leading to unregulated trade of veterinary drugs, systemic failures to enforce policies, regulations and standards that govern the handling and use of antibiotics.


**Close relationship between animals, humans and the environment.** As a consequence, this requires multidimensional and multi-stakeholder approaches to tackle AMR based on One Health.
Lack of awareness and knowledge. There is a lack of awareness of the problem of AMR among livestock keepers, drug sellers and veterinarians; strong beliefs on the necessity to use antibiotics to keep animals healthy, and lack of knowledge on prudent and medically rational use principles.

**Antimicrobial misuse.** Use of antibiotics for wrong indications (e.g. prophylactically, for viral/parasitic diseases), wrong dose, wrong therapy duration; extensive use in livestock of antibiotics listed as Critically Important Antibiotics for human medicine by the World Health Organization (WHO).

**Lack of diagnostics.** Antibiotics are commonly administered without receiving a diagnosis (neither clinical nor laboratory) from a professional. This is partly due to lack of access to laboratory diagnostic services and to pen-side test kits for practitioners, who rely heavily on syndromic presentation for their diagnosis and prescriptions.

**Low availability of good quality veterinary drugs.** Extensive over-the-counter availability of substandard antibiotics; absence of enforcement measures for market surveillance.

**Withdrawal period.** The recommended window of time between administering antibiotics and slaughtering or milking or laying eggs is often not respected due to lack of knowledge or economic reasons.

## Concluding remarks

Millions of livestock keepers currently benefit from this improved access to animal health services, good quality drugs and preventive veterinary treatments such as vaccinations. Rather than reducing the use of antibiotics, the practices described above aims to promote a prudent and medically rational use of antibiotics.

However, there is still lack of data on the effects of these actions on antimicrobial use and AMR


reduction. More assessments are needed in order to measure the impact of instalment of CAHWs and trainings of pastoralists and small-scale mixed livestock farmers in effectively fostering a more prudent use of antibiotics.

## System 2. Poultry production in high-income countries

The poultry sector is possibly the fastest growing of all livestock sectors. Driven primarily by very strong demand it has expanded, consolidated and globalised over the past years in countries of all income level. In production of poultry meat, the health of the animals is of great importance. Not only for food-safety, but also to reduce the risk of zoonotic diseases infecting humans.

### Three Good Practices for reduced use of antibiotics in poultry

The three initiatives described here were initiated by the government creating multi stakeholder team (FR), by a multistakeholder working group (NL) or by the producers (UK), and have many aspects in common.

### What has been done?

- Applying a multistakeholder approach.
- Mobilizing all stakeholders and support of communication campaigns for farmers and the general public in order to acknowledge that antibiotic resistance is a problem.
- Focus on disease prevention as an alternative to use of antibiotics. Improved farming practices including hygiene, buildings, biosecurity. Vacccination programs.
- More restrictions on sales of antibiotics.
- Restrictions of use of antibiotics critical in human medicine
- No prophylactic use of antibiotics.
- Tighter bonds between veterinarians and farmer, improved disease and antibiotic use monitoring and registration.
- Bench-marking of veterinarians and farms with respect to use of antibiotics.

### Results

Within the Ecoantibio[4] initiative from the French authorities to reduce the risks of antibiotic resistance in veterinary medicine, there has been a 43% reduction of antibiotics in the poultry sector in France from 2012 to 2016.

Testing of pooled milk samples by California Mastitis Test (CMT) at Dairy Cooperative Societies.

In the Netherlands, AVINED, a working group on antibiotics poultry sector was formed in 2008. The members of the working group are farmers organisations, slaughter and processing industry, egg industry, veterinary organisations and feed manufacturers. Between 2009 and 2017, the use of antibiotics (measured in Defined Daily Doses Animal - DDDAnat[5]) in the Dutch broiler sector was reduced by 73%.

The UK poultry meat sector, through the formation of the Antibiotic Stewardship Scheme in 2011, has taken decisive action to manage antibiotic usage across the sector. From 2012 to 2017, there has been an 82% reduction in the total use of antibiotics.

## Concluding remarks

Do these reductions of antibiotic use cause a slump in the production attributable to slower growth or increased disease? Data from the Netherlands and UK doesn't indicate this: from 2012 to 2016/2017 the production of broilers (NL) and overall poultry meat production (UK) increased by 10% and 11%, respectively.

# System 3. Mastitis prevention in effective and sustainable dairy production system

Mastitis is the most important disease in dairy production. It has been responsible for up to 85% of the antibiotics used. During the last decades, a successfully large improvement in udder health has taken place. Udder health mismanagement can threaten human health due to zoonotic or antimicrobial resistant pathogens adapting different environment. High quality milk with low somatic cell counts is crucial for product quality and better organoleptic quality for consumers. Good prevention, management and excellent animal welfare will reduce food loss in the whole chain from barn to table. A tailored plan for each country and herd should be applied.

## Diminishing mastitis to limit antibiotic use

In dairy herds, antibiotic resistance levels are generally low, transmission of resistance genes to humans is assumed to be of minor importance, and all milk being delivered to dairy processors is tested for antimicrobial residues. Despite of no apparent emergence or progression of resistance among mastitis causing agents, *Staphylococcus aureus* and, especially, extended-spectrum beta-lactamase (ESBL) *Escherichia coli* originating from animals have led to plenty of media exposure.

Management of chronic infected animals with high somatic cell counts (SCC) it is most important to avoid resistance. Adequate identification and treatment of severe or moderate clinical mastitis cases is crucial for animal welfare and AMR control. Currently, parenteral and intramammary therapy are commonly used administration routes. A local treatment, done intramammarily, on affected quarters, is used on mild clinical mastitis cases. Recent data shows that penicillins are antibiotics of first choice worldwide.

During the period of dry cow period, the dairy sector is striving to apply selective parenteral therapy (in the four quarters). However, an optimal selection process to correctly identify animals who

require selective treatment must be in place. The dairy sector believes that the elimination of an antibiotic shield does not necessarily have to result in a higher rate of new intramammary infections. By modifying the known risk factors and by optimising herd management, risk levels can be equally low as when prophylactic antibiotics are used.

## The Netherlands: selective dry cow treatment

For more than 50 years, blanket dry cow treatment has been advocated as the best way to prevent new intramammary infections during the dry period and was part of the five-point mastitis prevention programme.

### *What has been done?*

Since 2012, preventive use of antibiotics in veterinary medicine is prohibited in the Netherlands. Only the treatment of infected cows, known as 'selective dry cow treatment' is allowed. Thus, important measures to consider on the selection of cows have been udder health, productivity and economics[6,7].

### *Results and concluding remarks*

The effect of 'selective dry cow treatment' was evaluated in 1,657 cows in 97 Dutch dairy herds.

- Even though reduction of antibiotic use at drying-off could lead to an increased risk of mastitis at the individual level, this has not been demonstrated. Yet, if there would be a risk, the effect at the herd level is very small.
- The main criterion indicated by the farmers to select cows for 'dry cow treatment' was the somatic cell count history during the complete previous lactation.
- Selective dry cow treatment shows to be economically beneficial over blanket dry cow treatment.
- For the application of successful selective dry cow treatment a common attitude among farmers and veterinarians regarding the use of antibiotics is crucial.

## Växa Sweden: a National program "Health Package Milk"

This is a nation-wide herd health program for dairy herds, organised and executed by Växa Sweden extension service company for the dairy sector owned by some 6000+ farmers.

### *What has been done?*

- Yearly produced statistics of antibiotic use in Swedish milk production
- Monthly monitoring of animal welfare on farm level via the Dairy Herd Improvement database.
- 4 times yearly monitoring of antibiotic use on farm level
- Specially trained veterinarians supporting herd health management. Implementation of animal welfare plans on 150 new farms every year

### *Results and concluding remarks*

This program contributed to reduced resistance to antibiotics, lowered incidence mastitis cases and increased productivity per cow as illustrated below.

## India's control model for sub-clinical mastitis

In India, mastitis annual losses in 2009 were estimated at INR 72 billion (USD 107 million). Around 60% of the losses were due to the sub-clinical form. There was no national programme for mastitis control. Moreover, the large population of milk animals with its thin distribution and, the

| Trait (Swedish national data) | 1989 | 2018 |
|---|---|---|
| Sales of Ab mg/PCU (all farm animals)[8,9] | 32 | 12 * |
| Resistance (Pencillinase + *Staph. A.*)[8,9] | 8-10% | 2% |
| Incidence treated mastitis[10] | 25% ** | 7% |
| ECM Kg Milk/cow/year[11] | 7 500 | 10 250 |

* 2016, **2004

lack of adequate veterinary input services in many areas pose significant challenges in implementation of a control programme. Since January 2015, a pilot control programme was implemented in 100 Dairy Cooperative Societies (DCS) in one of the largest milk unions in the country.

### *What has been done?*

Detection and management of sub-clinical mastitis (SCM) by

- Awareness creation on SCM at village level
- Testing of pooled milk samples by California Mastitis Test (CMT). If positive animals were identified a cost-effective, easily executable protocol without the use of antibiotics was provided to the farmer.
- Advise on how to manage chronically infected animals, since culling of such animals is not an option available.

### *Results and concluding remarks*

The percentage of SCM as identified by CMT of pooled milk of farmer at DCS came down from 55% at the start of the pilot in Jan'15 to 17% by Dec'17. An average increase in milk yield of 1 litre per day had also been recorded in animals that become CMT negative following the protocol

Encouraged by success of the pilot project, NDDB has begun popularization of this cost effective, farmer friendly and eco-friendly model in 26 Milk Unions across 8 States, benefiting more than 100,000 dairy farmers. The detection and control of SCM and use of Ethno-Veterinary Medicine (EVM) for treatment of clinical cases of mastitis has helped the farmer in terms of increased milk production due to correction of losses from SCM and, drastic reduction in the treatment costs by the use of EVM. It is anticipated that this will also help in reducing the antibiotic residues in milk and thereby help in controlling AMR. Videos, posters and other extension material have been prepared in local vernacular to widely propagate this model of mastitis control. This simple and cost-effective control model described here may be a good tool to help address the issue of mastitis in the developing world and help farmers avert financial losses due to this disease.

## Future *Good practices*

In the next version of LAMP's *Good practices*, we aim to include other farming systems and provide sharper evidence from the field regarding antibiotic use and resistance, animal health and productivity.

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